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Such is the origin of some of the most remarkable of the planetary inequalities, and, in particular, of the great equations in the mean motions of Jupiter and Saturn. It is necessary, therefore, that the astronomer be furnished with the means of computing any term in the expansion of the disturbing function below the sixth order; since it has been found that there are inequalities depending upon terms of the fifth order, which have a sensible effect on the motions of some of the planets. The object of the author in the present paper is to give the function such a form that the astronomer may have it in his power to select any inequality he may wish to examine, and to compute the coefficient of its argument by an arithmetical process of moderate length. The investigation comprehends every argument not passing the fifth order; but as the formulæ are regular, the method may be extended indefinitely to any order.

8. "On the Reflex Function of the Medulla Oblongata and Spinalis, or the principle of Tone in the Muscular System." By Marshall Hall, M.D., F.R.S. L. & E.

The author, after commenting on the opinions of Le Gallois and Cruveilhier relating to the functions of the spinal marrow, adverts to a property or function of the medulla oblongata and spinalis, which he considers as having escaped the notice of these and all other physiologists; namely, that by which an impression made upon the extremities of certain nerves is conveyed to these two portions of the nervous system, and reflected along other nerves to parts different from those which received the impression. He distinguishes muscular actions into three kinds: first, those directly consequent on volition; secondly, those which are involuntary, and dependent on simple irritability; and thirdly, those resulting from the reflex action above described, and which include those of the sphincter muscles, the tonic condition of the muscles in general, the acts of deglutition, of respiration, and many motions, which, under other circumstances, are under the guidance of the will. Volition ceases when the head or brain is removed; yet, as he shows by various experiments, movements may be then excited in the muscles of the limbs and trunk, by irritations applied to the extremities of the nerves which remain in communication with the spinal marrow: but these actions cease as soon as the spinal marrow is destroyed. Hence the author concludes that they are the effect of the reflex action of the spinal marrow, which exists independently of the brain; and, indeed, exists in each part of the organ independently of every other part. He considers that this reflex function is capable of exaltation by certain agents, such as opium and strychnine, which in frogs produce a tetanic and highly excitable state of muscular irritability. Hence he is led to view the reflex function as the principle of tone in the muscular system. He considers that certain poisons, such as the hydrocyanic acid, act by destroying this particular function. The effects of dentition, of alvine irritation, and of hydrophobia, of sneezing, coughing, vomiting, tenesmus, &c. &c., are adduced as exemplifications of the operation of the same principle when in a morbid state of exaltation.